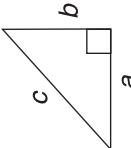


Physics Reference Sheet

Useful Equations

| | | | |
|--------------------------------|--|--|--|
| $v_{av} = \frac{d}{t}$ | v_{av} = average velocity d = displacement t = time | $v = \lambda f$ | v = speed λ = wavelength f = frequency |
| $a_{av} = \frac{v_f - v_i}{t}$ | a_{av} = average acceleration v_f = final velocity v_i = initial velocity t = time | $E = hf = h \left(\frac{c}{\lambda} \right)$ | E = energy h = Planck's constant f = frequency c = speed of light λ = wavelength |
| $F = ma$ | F = net force m = mass a = acceleration | $a^2 + b^2 = c^2$ |  |
| $W = mg$ | W = weight m = mass g = acceleration due to gravity | Values of Physical Constants | |
| $F = G \frac{m_1 m_2}{d^2}$ | F = force G = gravitational constant m_1 = mass of first object m_2 = mass of second object d = distance between the objects | $g = 9.8 \text{ m/s}^2$ $G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$ $K = 9.0 \times 10^9 \text{ Nm}^2/\text{C}^2$ $h = 6.63 \times 10^{-34} \text{ Js}$ $c = 3.00 \times 10^8 \text{ m/s}$ | Physical Quantities and Units |
| $F = k \frac{q_1 q_2}{d^2}$ | F = force k = Coulomb's constant q_1 = charge on first object q_2 = charge on second object d = distance between the objects | | |
| $KE = \frac{1}{2}mv^2$ | KE = kinetic energy m = mass v = speed | | |
| $PE = mgh$ | PE = potential energy m = mass g = acceleration due to gravity h = height | | |
| $T = \frac{1}{f}$ | T = period f = frequency | | |

Useful Equations (continued)